

## Fully funded PhD studentship, ETH Zurich, Switzerland

**Project** The consequences of tropical forest fragmentation for biotic interactions maintaining plant diversity.

**Start Date** January 2014

**Summary** Interactions between plants and their pathogens and insect herbivores are crucial for maintaining plant diversity. However, the potential for anthropogenic environmental change to disrupt these processes are poorly understood. This project will seek to evaluate the effects of forest fragmentation on plant-insect and plant-pathogen interactions and the possible implications for plant biodiversity in human-modified landscapes.

**Location** ETH Zurich, Switzerland, with fieldwork in Kodagu, India.  
Primary affiliation: Ecosystem Management, Institute of Terrestrial Ecosystems.

**Supervisors** Dr Robert Bagchi and Prof. Jaboury Ghazoul (Ecosystem Management, ETH Zurich),

**Requirements** We are seeking highly motivated applicants with a desire to work on tropical forest ecology. Tropical field work experience would be advantageous, and applicants must be prepared to spend substantial time doing field-based work (approx. 4-6 months per year). Essential requirements for a successful application include:

1. Good B.Sc and M.Sc degrees in ecology or environmental science.
2. Very good spoken and written English; knowledge of German or Kannada would be advantageous but are not necessary.
3. Excellent quantitative and statistical skills; familiarity with experimental design is desirable.

**Group** The Professorship of Ecosystem Management comprises around 20 researchers and staff and has a diverse international composition. Research within the group tackles a range of topics relating to plant ecology, conservation and ecosystem management. See our web site for more details ([www.ecology.ethz.ch](http://www.ecology.ethz.ch)).

**Conditions** Three year funded appointment within the Professorship of Ecosystem Management (Department of Environmental Systems Science at ETH Zurich). The position is funded at the ETH Zurich PhD student salary scale. The student will be based in Zurich, with extended periods of fieldwork in Kodagu, India. The PhD students might be required to do some course work at ETH Zurich as partial fulfillment of the PhD requirements.

**Application** Please apply online at <http://internet1.refline.ch/845721/2670/++publications++/1/index.html>. You will need to upload the following documents with your application: (1) a 1 page letter of motivation describing your research interests and reasons for doing a PhD on this topic; (2) a full CV, including any relevant experience; and (3) names and addresses of two referees.

Closing date for applications is **2 September 2013**. The position is open to candidates of all nationalities, although applicants from India are particularly welcome. Short-listed candidates will be interviewed in late September. Travel expenses up to 200 CHF will be available for interviewed candidates from Europe. Skype interviews are possible for candidates outside Europe.

For informal enquiries contact Dr Robert Bagchi ([robert.bagchi@usys.ethz.ch](mailto:robert.bagchi@usys.ethz.ch)).

## **PhD Project Description**

### **The consequences of tropical forest fragmentation for biotic interactions maintaining plant diversity.**

**Location** ETH Zurich, with extensive fieldwork in Kodagu, India

**Start Date** January 2014

#### **Summary**

Increasing evidence suggests that insect herbivores and pathogens help maintain plant species coexistence in tropical forests by exerting density-dependent control of their hosts. Human modification of the landscape is likely to disrupt these interactions, with potential long-term consequences for plant diversity. This project will explore how pathogens and insect herbivores enhance plant diversity and examine how forest fragmentation influences this process. Field work will be carried out in a fragmented landscape in the Western Ghats Biodiversity Hotspot in South India. The research will combine field experiments with data analysis using modern statistical tools.

#### **Objectives**

The primary objective is to understand how forest fragmentation might impact the processes that maintain diversity in tropical forests. The project takes a community ecology perspective rather than focusing on individual species in order to gain general understanding of the processes maintaining plant diversity. The specific objectives include

1. Experimental investigations of the extent of density dependent control of plant populations by insect herbivores and pathogens, and the implications for plant diversity.
2. Experiments to determine how forest fragmentation modifies this density dependence.
3. Examining how fragmentation modifies the representation of plant traits in remaining forest.
4. Understanding how changes in the representation of plant traits in forest fragments influences herbivory and pathogen incidence.

#### **Collaboration and support**

The project is ambitious and will be demanding of the PhD student's time and effort. The PhD student will be supported in the field by assistants but, nevertheless, strong motivation and willingness to work hard in the field are essential. The Ecosystem Management group has several other projects based in Kodagu, which will provide an academic peer group during field work. The project includes strong collaborations with Prof. R. Uma Shaanker (University of Agricultural Sciences, Bangalore) in India, and Dr Owen Lewis (University of Oxford, UK).

#### **Additional educational opportunities**

In addition to normal PhD course requirements at ETH Zurich, there are many opportunities for the PhD student to attend workshops and conferences ETH Zurich and elsewhere in Europe. Dr Bagchi will train the student in the relevant experimental design and statistical techniques. The Ecosystem Management and other groups in the department run relevant courses (e.g. Tropical Rainforest Ecology, Experimental Ecology, Forest Pathology) that the PhD student might attend, and seminar series' that provide opportunities to engage with international scientists from a variety of disciplines.